

Table 1: Summary of Data and Potential Exposure Scenarios				
Description	Locations	Data Results <sup>1</sup>	Potential Impacts/Exposure Scenarios	Data Source(s)
Lead Additive Area	Lead Additive Area	Lead 43,200 – 55,049 mg/kg  <u>Perched Water:</u> 2-methylphenol 1.5x10 <sup>6</sup> µg/l Phenol 270,000 µg/l 2,4 dimethylphenol 1.3x10 <sup>6</sup> µg/l Lead >752 µg/l Benzene 2400 µg/l	Sand Creek (direct discharge/migration to surface water/sediment)  Ecological and Human Receptors (direct exposure)  Human Receptors (indoor air)	RI Field Data, 2016 LMS, 2016 Removal Assessment, 2016 ESI Wilcox Oil, 1997 ESI Wilcox/Lorraine 2011 Lorraine Refinery SI, 2009 ESI Wilcox Oil, 2012
Tank Waste	Lorraine Process Area Tank 1 Tank 3 NTF-1 Tank 10 Tank 11 Tank 12 Pit 1	TPH 23,200 - 875,000 mg/kg Lead 513 – 3,660 mg/kg total xylenes 0.28 – 0.45 mg/kg toluene 0.27 mg/kg  <b>PAHs</b> Benzo(a)anthracene 0.76 - 12 mg/kg Benzo(a)pyrene 1.2 - 12 mg/kg Benzo(b)fluoranthene 2.4 - 20 mg/kg Benzo(k)fluoranthene 7.5 mg/kg Chrysene 13 - 37 mg/kg Fluoranthene 2.5 - 17 mg/kg Indeno(1,2,3-cd)pyrene 3.1 – 4.4 mg/kg phenanthrene 27 - 520 mg/kg pyrene 2.1 - 230 mg/kg 2-methylnaphthalene 49 - 1,400 mg/kg		

<sup>1</sup> This column is not all inclusive. This is a limited summary of detected contaminants, specifically listing those with the highest concentrations.

Abbreviations:

TPH=total petroleum hydrocarbon

mg/kg=milligram per kilogram

µg/l=micrograms per liter

ESI=Expanded Site Investigation

SI=Site Investigation

ERT=Environmental Response Team

RI=remedial investigation

PAHs=polycyclic aromatic hydrocarbons

**Table 2: Passive Soil Gas and Indoor Air/Sub-slab Data**

Passive Soil Gas Results	
COMPOUNDS	Result: ng
Benzene	8652
Toluene	2,682
Ethylbenzene	8,453
p & m-Xylene	15,656
o-Xylene	6,326
Naphthalene	2,145
2-Methylnaphthalene	10,027

Results are nanograms (ng). There are no screening numbers for mass comparison. Data presented are the highest recorded results.

Indoor Air/Sub-slab		
Analyte	Result: ( $\mu\text{g}/\text{m}^3$ )	Health Based Screening Level ( $\mu\text{g}/\text{m}^3$ )
Chloroform	0.93	0.12
1,4-Dichlorobenzene	1.08	0.26
Benzene	5.57	0.36
Ethylbenzene	1.44	1.1
1,3-Butadiene	11.7	0.094
Trichlorofluoromethane	43.4	--
1,2,4-Trimethylbenzene	2.12	2.1

Results are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )

(--): no health based screening number available  
Data presented are the highest recorded results.

<b>Table 4: Areas of Remediation – Estimated Volume and Cost</b>		
<b>Area Name</b>	<b>Volume Estimated (cubic yards)</b>	<b>Estimated Cost</b>
Lorraine Waste	952.22	\$170,914
Lead Sweetening Area	6,532.44	\$989,032
Tank 1	3,322.22	\$505,318
Tank 3	3,608.22	\$544,806
NTF-1	817.19	\$153,306
Tank 10	9,901.78	\$1,427,334
Tank 11	430.93	\$100,133
Tank 12	4,787.78	\$712,708
Pit 1	4,269.07	\$643,018
Total	34,621.85 (5.38 Acres)	\$5,246,569.00

Source: Remedial Action Cost Engineering and Requirements System, Version 11.2.16.0, software used to estimate cost.  
 Conversion: 1.4(cy) = tons

<b>Table 3: Comparison of site data to Health Based Screening Levels</b>				
	<b>Contaminant</b>	<b>Data Results (mg/kg)</b>	<b>Health Based Screening Level (mg/kg)</b>	<b>Health Based Screening Level Basis</b>
Lead Sweetening Area	Lead	55,049	200 - 400	Protection of blood lead levels in children
Tank Waste	Benzo(a)anthracene	12	1.1	Residential Cancer Screening Number at 10 <sup>-6</sup> Risk
	Benzo(a)pyrene	12	0.11	Residential Cancer Screening Number at 10 <sup>-6</sup> Risk
	Benzo(b)fluoranthene	20	1.1	Residential Cancer Screening Number at 10 <sup>-6</sup> Risk
	Indeno(1,2,3-cd)pyrene	4.4	1.1	Residential Cancer Screening Number at 10 <sup>-6</sup> Risk
	2-methylnaphthalene	1400	240	Residential Non-cancer Screening Number at Hazard Index=1
	Naphthalene	14	3.8	Residential Cancer Screening Number at 10 <sup>-6</sup> Risk
	<u>Perched Water (result of migration from waste material)</u>			
		<b>Data Results (µg/kg)</b>	<b>Health Based Screening number (µg/kg)</b>	<b>Health Based Screening Number Basis</b>
	2-methylphenol	1.5x10 <sup>6</sup>	930	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	Phenol	270,000	5800	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	2,4 dimethylphenol	1.3x10 <sup>6</sup>	360	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	Lead	>752	15	Action Level for Drinking Water
	Benzene	2400	5	Maximum Contaminant Level for Drinking Water

<b>Table 5: Soil Health Based Target Levels</b>			
<b>Contaminant</b>	<b>Data Results (mg/kg)</b>	<b>Health Based Target Level (mg/kg)</b>	<b>Health Based Target Level Basis</b>
Lead	55,049	200 - 400	Protection of blood lead levels in children
Benzo(a)pyrene	12	0.11	Residential Cancer Screening Number at 10-6 Risk

<b>Table 6: Remedy Comparison to Nine Criteria</b>			
Remedy	No Action	Excavation and Offsite Disposal	Excavation, Consolidation, and Capping
Overall Protection of Human Health and the Environment	0	2	1
Compliance with ARARs	0	2	1
Long-term Effectiveness and Permanence	0	2	1
Reductions in Toxicity, Mobility, and Volume through Treatment	0	1	1
Short-term Effectiveness	0	2	2
Implementability	2	2	2
Cost	\$0	\$5,260,323	\$5,689,489
State Acceptance	State Supports the Proposed Early Action		
Community Acceptance	Assessment determined after the review and comment period		
Total Score	2	11	8

**Score Definitions**

- 0 does not satisfy the criteria
- 1 Satisfies the criteria but requires long-term maintenance or partially satisfies
- 2 Satisfies the criteria